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Patent DE 101 21 973 C1

Application date: 5 May 2001

Public release date of the patent granting: 2 May 2002

Patent owner: BVS 55270 Klein-Winterheim, Germany

Represented by: Luderschmidt, Schüler & Partner GbR, 65189 Wiesbaden

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For the judgment of the patent possibility the following copies were observed: DE 197 29 711 C1

Apparatus to remove the spinal cord and spinal cord skin from the spinal cord cavity of a slaughtered animal.

The presented patent has to do with :

PG- 1 (57)

Description :

didn't translate - column 1, 2, 3+4

Patent Claims

(column 5+6)

1. An apparatus to remove the spinal cord and the spinal cord skin from the spinal cord cavity of a slaughtered animal with a motor driven milling tool (14), in which a rotating milling tool (14) is located in a partially enclosed housing (4), and cutters that are located circumferentially on the front face of the milling tool (14) and that have a frontal face exposure of part of the cutter edges (40), to which either one or both of the long sides a side of the cutter edges (42', 42'') is connected, **thereby recognized**, that on one or both sides of the cutter at least one of the exposed cutter edges on the side (42', 42'') is equipped with a contacting scraper element (44) mounted in the housing (4), whereby the side exposed cutter edge (42', 42'') contacting scraper element (44) is mounted angularly to the side exposed cutter edge (42', 42'').
2. An apparatus according to claim 1, **thereby recognized** that the scraper angle (α) between the scraper element (44) and the scraper element (44) contacting side exposed cutter edge (42', 42'') is larger than 10° .
3. An apparatus according to 1 or 2, **thereby recognized** that the scraper element (44) contacts at least two cutters simultaneously.
4. An apparatus according to on of the previous claims, **thereby recognized** that the scraper element (44) is spring loaded against the side exposed cutter edges (42', 42'').
5. An apparatus according to one of the previous claims, **thereby recognized** that the scraper element (44) is elastically deformable, whereby the milling tool (14) and

- the scraper element (44) are oriented to one another in such a way that the scraper element (44) is elastically displaced in the rotating direction.
6. An apparatus according to one of the previous claims, thereby recognized that the cutters on both long sides of a side exposed cutter edge (42', 42''), whereby on both sides of the cutter at least one of the side exposed cutter edge (42', 42'') contacting scraper element (44) mounted in the housing (4), that are mounted parallel to one another.
 7. An apparatus according to one of the previous claims, thereby recognized, that the housing (4), on the opposite side of one of the faces of the milling tool (14) exhibits a vacuum opening (56) and a vacuum connector (26) for the connection of a vacuum hose (28).
 8. An apparatus according to claim 7, thereby recognized that at least one of the scraper elements (44) is mounted behind the vacuum opening (56) in the rotational direction.
 9. An apparatus according to one of the previous claims, thereby recognized that the cutters on a tool holder (30) are fastened replaceable cutter plates (32), whereby the tool holder (30) exhibits radially jutting holders (34) on which cutting plates (32) are fastened.
 10. An apparatus according to claim 9, thereby recognized that the cutter plates (32) are fastened radially transferable on the radially jutting holders (34).
 11. An apparatus according to claim 10, thereby recognized that the cutter plates (32) each by a through hole (38) in the cutter plate (32) a screw (36) extends to fasten on to the radially jutting holder (34).

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For the judgment of the patent possibility the following copies were observed: DE 197 29 711 C1

(54)

Apparatus to remove the spinal cord and spinal cord skin from the spinal cord cavity of a slaughtered animal.

(57)

The presented patent has to do with an apparatus for removal of the spinal cord and spinal cord skin out of the spinal cord cavity in slaughtered animals with a motor driven milling tool 14, that has a rotational milling tool 14 located in a partially closed housing 4. Further cutters are planned that are circumferentially located on the face of the milling tool 14 and exhibit an exposed face cutting edge 40 and which on one or both long sides has a side exposed cutting edge 42' or 42". According to the patent on one or both sides a scraper element 44 is mounted in the housing 4 and contacts at least one of the side exposed cutting edges 42' or 42", whereby the side exposed cutting edge 42' or 42" scraper element 44 is angularly mounted to the side exposed cutting edges 42' or 42". The angular placement of the scraper element 44 with respect to the scraper element contacting side exposed cutting edges 42' or 42" make a certain that the removed spinal cord material and spinal cord skin can be scraped off so that it can be transported away.

Description

0001 The presented invention concerns an apparatus to remove the spinal cord and spinal cord skin out of the spinal cord cavity of a slaughter animal with a motor driven milling tool.

0002 Out of the DE 197 29 711 C1 is an apparatus to remove the spinal cord and the spinal cord skin out of the spinal cord cavity of a slaughter animal known, that exhibits a motor driven milling cutter, in which a rotating milling tool is located in a partially enclosed housing, furthermore cutters are expected that are located circumferentially on the front face of the milling tool and that have a frontal face exposure of part of the cutter edges, to which either one or both of the long sides of the cutter edges is connected. Inside the housing there are

- further fixed knives to be expected, that stick out oblique to the rotational direction of the milling tool, in order that trimmed away material be reduced.
- 0003 The known apparatus has proven itself in practice and satisfies the high requirements in regards to the functionality. Despite the knives, it is possible that remnants of the removed sinewy elastic spinal cord skin to remain in the housing, so that, especially with regards to the BSE danger, a better cleaning of the known apparatus is required. Furthermore, it is possible these remnants limit the movement of the milling tool.
- 0004 The presented invention is based on the requirement to, in an apparatus for removal of the spinal cord out of the spinal cord cavity of a slaughter animal, that along with the remnant free removal of the spinal cord and spinal cord skin from the spinal cord cavity, allow a surer disposal of the sinewy elastic material.
- 0005 The solution to this requirement follows with the attributes given in claim 1. Advantageous construction forms of the invention are the object of the under-claims.
- 0006 In the housing there is, on one or both sides of the cutter at least one of the exposed cutter edges on the side is equipped with a contacting scraper element, so that the cut off material can be rubbed off. That the side exposed cutting edge contacting scraper element is mounted at an angle to the side exposed cutting edge. In this context mounted at an angle is to mean that the side exposed cutting edge is not parallel to the scraper element as long as they are in contact.
- 0007 The angular alignment of the scraper element and the side exposed cutting edge makes a certain scraping off of the removed spinal cord skin in front of the cutter edge possible, that would not be possible with a parallel alignment of the scraper element and the side exposed cutter edge. The removed spinal cord skin is scraped off radially towards the outside by the relative motion of the parts with one another. During the scraping it is possible for the removed spinal cord skin to be simultaneously on the contact point between the parts and reduced. Further, the scraper element can be, on its side exposed cutting area, improved or sharpened.
- 0008 In a preferred execution, the scraping angle between the scraper element and the scraper element contacting side exposed cutting edge is larger than 10° , whereby scraper angle is understood to be the small angle between the scraper element and the scraper element contacting side exposed cutting edge. The scraping effect is especially satisfactory with a scraping angle of 10° and could be improved with an even larger scraper angle.
- 0009 In an especially advantageous execution of the invented apparatus, the scraper element contacts at least two knives at the same time. This means that the scraper element contacts at least two knives, in that respect their side exposed cutting edges, regardless of the position of the milling cutter. An arrangement of this form makes a continuous and especially certain scraping off the cutting edges of the removed spinal cord skin.
- 0010 In order to have enough power for scraping and additionally reducing of the spinal cord skin of the removed spinal cord skin by the side exposed cutting

edges, in the preferred execution the scraper element is spring pre-loaded against the side exposed cutting edges. Additionally, the spring pre-loading functions as an automatic adjuster for the wear on the parts which shear against one another, specifically the side exposed cutting edges and the scraper elements.

- 0011 In a further preferred execution, the scraper element can be elastically deformed, whereby the milling tool and the scraper element are arranged to one another in such a way that the scraper element is elastically deformed in the rotational direction. The elasticity of the scraper element functions on the one hand as a pre-loading of itself against the side exposed cutting edges, and causes on the other hand the scraper element to be formed in the area of contact to the side exposed cutting edges which causes a better scraping off.
- 0012 Preferably these cutters are on both long sides of the side exposed cutter edges, whereby in the housing on both sides of the cutter, at least one side exposed cutter edge rubbing scraper element is mounted parallel to the other.
- 0013 According to a further advantageous execution, the housing exhibits opposite a face of the milling cutter a vacuum opening and a vacuum connection for the attachment of a vacuum hose. The vacuum opening, connection and hose serve to vacuum away the removed spinal cord material and skin.
- 0014 In order to remove the sinewy elastic spinal cord skin especially fast from the housing of the invented apparatus, at least one of the scraper elements in an advantageous execution is mounted behind the vacuum opening in the rotational direction. Thereby the removed material can be directed into the vacuum opening directly after the scraping so that it is not possible to stay in the housing of the apparatus.
- 0015 In a further preferred execution the cutters are interchangeably mounted cutter plates on a tool carrier. The tool carrier exhibits radially extending holders on which cutter plates are affixed.
- 0016 In order to accommodate wear of the cutter plates on the face exposed cutter edges, the cutter plates are mounted in such a way on the radially extending holders that they can be moved in a radial direction. By advanced wear on the face exposed cutter edges, the cutter plates must only be moved farther out radially.
- 0017 In order to move the cutter plates, in a preferred execution of the invention, they are mounted by a screw going through a slotted hole in the cutter plate into the radially extending holders. In order to move the cutter plates the screw is loosened, the plate is moved outward, whereby the screw remains in its slotted hole, and after the screw is tightened.
- 0018 In the following the invention will be explained with a execution example referencing the accompanying figures.
- 0019 [It shows:]
- 0020 Fig. 1 an exploded view representation of a execution example of the invented apparatus.
- 0021 Fig. 1a the detail A from Fig. 1 in separate form.
- 0022 Fig. 2 a side view of the apparatus from Fig. 1
- 0023 Fig. 3 a side view of the apparatus from Fig. 1 without a housing cover and

- 0024 Fig. 4 a side view of the apparatus from Fig. 1 without a housing cover and milling cutter.
- 0025 The invented apparatus to remove spinal cord and spinal cord skin exhibits a handle 2, on which a flat housing 4 is connected (Fig. 1, 2). The housing 4 includes a base body 6 and a housing cover 8, where by previous are fastened by screws 10 to the base body 6. Further a holder element 12 is brought on the housing 4 that allows for the hanging of the apparatus on a suitable hanging apparatus (not shown). Within the housing 4 is a milling tool 14 on a not shown rotational drive shaft, whereby the attachment is done with a lock washer 16. The housing 4 is open on one side in such a way that the milling tool 14 sticks out partially from the housing 4.
- 0026 The drive shaft (not shown) is driven by an air powered motor 18, which is partially integrated into handle 2. The supply of compressed air is via a compressed air connector 20, which is on the end of the handle 2 opposite the housing 4 and on which a not shown compressed air supply can be connected. On the handle 2 is additionally a control lever 22 for the control of the compressed air supply, which is partially protected by a guard so that an unwanted operation of the lever 22 can be generally avoided. On the housing 4 there is also a vacuum connection 26 where a vacuum supply 28 can be connected so that the spinal cord or spinal cord skin pieces separated by the milling cutter can be sucked away from the housing 4 through the vacuum connection 26 and the vacuum supply 28.
- 0027 In order to clean the apparatus and/or to remove the milling tool, the screws 10 only have to be removed and the housing cover 8 lifted off. The housing cover 8 could also be attached by a quick release mechanism, so that in the case of frequent cleaning, only a small amount of time is needed.
- 0028 In the following the milling cutter 14 with reference to Fig. 1 and 3 will be described in detail. The milling cutter 14 includes a disc shaped tool holder 30 as well as many cutter plates 32. The tool holder 30 exhibits many jutting holders 34 on which, each similar to saw blade tooth, cutter plates 32 are fastened to the front side in the rotation direction of the holders 34 on the tool holder 30 with removable screws 36. In order to move the cutter plates 32 in the radial direction, the cutter plates 32 exhibit slotted holes 38, through which the screws 36 go. The cutter plates 32 exhibit a radially outward face side cutting edge extension 40, which is semi-circular in the representative execution. The face side exposed cutting edge 40 goes along both long sides of the cutter plate 32 into the side exposed cutting edge 42', 42". With the representative execution there are a total of twelve symmetrically placed cutter plates 32 screwed to their respective holders 34.
- 0029 The invented apparatus exhibits long outstretched scraper elements 44, that will be described in detail with reference to Fig. 1 and 1a. Slotted holes 46 are in the base body 6 and housing cover 8 that are opposite and parallel one another. The plate formed scraper element 44 which are elastically built, stick through the slots and meet on the sides the exposed side cutting edge 42' and 42" of cutter plate 32. Because of the elasticity of the scraper element 44 they are

displaced in the rotational direction and in this way are pre-loaded against the exposed side cutting edges 42' and 42".

- 0030 The scraper plates 44 are attached to a carrier 46 outside the housing 4. The carrier is guided on to support elements 48, which are on one end attached to the housing 4 and on the other a brace 50 that attaches them to one another. Between the brace 50 and the carrier 46 around the support elements 48 there are springs 52 so that the carrier is pressed in the direction of the housing 4 and so that the scraper element 44 is pre-loaded against the side exposed cutting edges 42' and 42". The execution represented in Fig. 1 differs from the execution in Fig. 1a in that the support elements are merely screws 54 and the brace 50 is in the shape of a cover so that the springs 52 are not accessible. This has the advantage that the springs 52 cannot be dirtied from spinal cord material and the operator has less risk of injury.
- 0031 With reference to Fig. 3 or 4 the relationship between the scraper elements 44 and the side exposed cutter edges 42' and 42" will be detailed. When the side exposed cutter edge 42' that is on the scraper element 44 goes away from the viewer in Fig. 1 and touches the scraper element, the exposed cutter edge and the scraper element form a scraping angle α . The scraping angle α should remain above 10° so that the spinal cord skin remnants are certain to be scraped from the side exposed cutter edge 42". In the executed representation the scraper element 44 contacts at least 2 cutter plates 32 simultaneously. Thereby a continuous and certain scraping of the spinal cord skin remnants is possible.
- 0032 In order that a certain removal of the separated parts from the housing 4 is possible the scraper element 44 is located in the vacuum connection directly behind the vacuum opening 56 in the rotational direction, so that scraped off material can be simultaneously sucked into the vacuum supply.

Patent Claims

1. An apparatus to remove the spinal cord and the spinal cord skin from the spinal cord cavity of a slaughtered animal with a motor driven milling tool (14), in which a rotating milling tool (14) is located in a partially enclosed housing (4), and cutters that are located circumferentially on the front face of the milling tool (14) and that have a frontal face exposure of part of the cutter edges (40), to which either one or both of the long sides of the cutter edges (42', 42") is connected, **thereby recognized**, that on one or both sides of the cutter at least one of the exposed cutter edges on the side (42', 42") is equipped with a contacting scraper element (44) mounted in the housing (4), whereby the side exposed cutter edge (42', 42") contacting scraper element (44) is mounted angularly to the side exposed cutter edge (42', 42").
2. An apparatus according to claim 1, **thereby recognized** that the scraper angle (α) between the scraper element (44) and the scraper element (44) contacting side exposed cutter edge (42', 42") is larger than 10° .

3. An apparatus according to 1 or 2, thereby recognized that the scraper element (44) contacts at least two cutters simultaneously.
4. An apparatus according to one of the previous claims, thereby recognized that the scraper element (44) is spring loaded against the side exposed cutter edges (42', 42'').
5. An apparatus according to one of the previous claims, thereby recognized that the scraper element (44) is elastically deformable, whereby the milling tool (14) and the scraper element (44) are oriented to one another in such a way that the scraper element (44) is elastically displaced in the rotating direction.
6. An apparatus according to one of the previous claims, thereby recognized that the cutters on both long sides of a side exposed cutter edge (42', 42''), whereby on both sides of the cutter at least one of the side exposed cutter edge (42', 42'') contacting scraper element (44) mounted in the housing (4), that are mounted parallel to one another.
7. An apparatus according to one of the previous claims, thereby recognized, that the housing (4), on the opposite side of one of the faces of the milling tool (14) exhibits a vacuum opening (56) and a vacuum connector (26) for the connection of a vacuum hose (28).
8. An apparatus according to claim 7, thereby recognized that at least one of the scraper elements (44) is mounted behind the vacuum opening (56) in the rotational direction.
9. An apparatus according to one of the previous claims, thereby recognized that the cutters on a tool holder (30) are fastened replaceable cutter plates (32), whereby the tool holder (30) exhibits radially jutting holders (34) on which cutting plates (32) are fastened.
10. An apparatus according to claim 9, thereby recognized that the cutter plates (32) are fastened radially transferable on the radially jutting holders (34).
11. An apparatus according to claim 10, thereby recognized that the cutter plates (32) each by a through hole (38) in the cutter plate (32) a screw (36) extends to fasten on to the radially jutting holder (34).